THE RELATIONSHIP BETWEEN DDT UPTAKE, HORMONAL CHANGES AND CIRCULATING HOMOCYSTEINE CONCENTRATIONS

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Background and aims: As sex hormones reportedly alter homocysteine metabolism, we hypothesised that pesticides that exert anti-androgenic and estrogenic may affect total homocysteine (t-Hcy) concentrations. Plasma samples for total homocysteine (t-Hcy) were collected during some of the visits of an on-going cross-sectional study evaluating male fertility parameters with Indoor Residual Spraying (IRS).
Methods: The t-Hcy concentration and its determinants, estradiol (E2) and testosterone sub-fractions, and SHBG and Albumin were compared between young males from sprayed (n=219) and unsprayed villages (n=215), taking the variance of the data and co-variates into account. Regression analyses were performed in the exposure group.
Results: The mean (SD) t-Hcy concentrations in sprayed villages were significantly lower (7.7(2.4) vs 8.3(2.5) µmol/L; $p<0.05$), while t-Hcy determinant concentrations did not differ significantly. Lowertotal testosterone (t-T) concentrations (21.3(6.0) vs 25.2(9.1) nmol/L; $p<0.001$), % bio-available testosterone (%bio-T) (40.9(8.3) vs 50.3(14.5); $p<0.005$), albumin (44.8(4.5) vs 46.0(6.0) mg/dL; $p<0.05$) and E2 concentrations (115.6(32.5) vs 136.2(36.8) pmol/L; $p<0.001$) were observed in non-sprayed villages. After correcting for vitamin B12 and either *p,p'*DDE or *p,p'*DDT, t-Hcy concentration no longer differed significantly between groups. In sprayed villages significant Spearman rank correlation coefficients were observed for t-Hcy with *p,p'*DDE, *p,p'*DDT,and bio-T (respective r-values: -0.260, -0.289, 0.197; $p<0.005$). When comparing regression lines for Log_Hcy = %bio_T, the slopes did not differ significantly between groups, while elevation differed significantly ($F=7.28$, $DF=1, 423$, $p= 0.007$). Concentration-dependent linear trends were observed, using Polynomial contrast, across *p,p'*DDE and *p,p'*DDT quartiles for Log-Hcy (decreasing) and for serum creatinine (increasing) ($p<0.001$).
Conclusions: Lower t-Hcy concentrations appear to be related to DDT uptake. This stucy does not explain these findings. Association between t-Hcy and sex hormones is not clearly evident, except for the association with %bio-T. What is apparent is that uptake of DDT may be associated with altered sex hormone and homocysteine homeostasis.